while a general review of the subject of length measurement, in which other instruments and tools, including the cathetometer microscope, are described, concludes the chapter.

This brief review of the first is sufficient to show the system on which each of the eight chapters is put together.

In the second chapter on angular measurement the circular Vernier, the mirror and scale, and the spirit level of course form the subject of lessons. There is also a lesson on that simple and easily-constructed instrument of M. Cornu, the optical lever.

The chapter on the estimation of mass is very complete, for, besides an explanation of the theory and use of the balance, there is a page headed "precautions in weighing," a copy of which might well be placed on the wall above every balance in a laboratory; there is an excellent paragraph on the sensibility of the balance, with a diagram showing the observed sensibility of an Oertling, a Bunge, and another short beam balance. There is, lastly, a lesson on the errors of weights, in which instructions are given for testing a set of weights.

In the chapter on measurement of area and volume a large amount of space is given to an explanation of the Amsler planimeter. This beautiful little instrument, as is well known, gives the area of a figure round which its point is traced. In a new edition it is to be hoped that the new "precision" planimeters which in accuracy and some other respects are superior to that of Amsler, will be described.

In Chapter V., on the determination of density, are to be found full instructions for finding the specific gravity of solids and liquids by a host of methods. The corrections for buoyancy are carried to such an extent that account is taken of the latitude and the height above the sea-level in calculating the density of the air from the barometer reading; further, the effect of moisture in lightening the air is guarded against. The hydrometers of Fahrenheit, Baumé and Twaddle are described, and instructions are given for making them. The exact determination of the density of a gas, being a problem of great difficulty, is considered unsuitable for imitation in the laboratory; however, an outline of Regnault's method is given.

The chapter on elasticity, tenacity, and capillarity differs from others in the book in that the theory of the subject is given at length, as well as instructions for performing experiments in the laboratory.

The chapter on the determination of atmospheric pressure contains a full account of the method of filling and using a standard mercurial barometer. The aneroid barometer is not mentioned.

The last chapter, on time, gravitation, and moments of inertia, is purely mechanical. The difference between the sidereal, solar, and mean solar days is explained, but instructions are not given for taking a transit. Clocks, chronometers, stop-watches, the water-clock, and the chronograph of Hipp, in which a reed vibrating 1000 times a second replaces the pendulum of a clock, are briefly described.

The determination of g by Borda's and by Kater's method is given. Several forms of electro-chronograph are described—among them one in which a primary circuit is broken at the beginning and end of the interval to be measured, while the induced currents cause a spark to pass between the style of a tuning-fork and a smoked drum, so that the number of waves between the two dots produced by the sparks measures the time.

As has been already said, completeness and attention to details are apparent in every chapter of the first volume, while the names of the authors are sufficient as a guarantee of accuracy. The only cause for regret is the fact that the public has to wait for the two volumes on real physics, for those who read the first, which deals mainly with measurements of geometrical and mechanical properties, and which is therefore essentially an introduction, are likely to be impatient to see the series completed.

OUR BOOK SHELF

The History of a Lump of Gold from the Mine to the Mint. By Alexander Watt. (London: A. Johnson.)

THE author has endeavoured to treat his subject so as to interest general readers, but he might have spared them such moralisations, suggested by the word "gold," as "With what silent rapture we receive it as our own, and how different is the feeling when it comes into our hands merely to convey to another." The compilation of facts connected with the history of gold and its manufacture into coin has, however, been carefully done. Considering that the superstructure of modern chemistry was built up on the labours of the "early alchemists," we object to their being described as "those remarkable imposters," and indeed the quotations from the writings of the early chemists which are given abundantly prove their claim to more respectful treatment. The metallurgy of gold is dealt with in the most slender way, but the chapter relating to the operations of coinage is more satisfactory, and is confessedly an abstract of a series of Cantor lectures recently delivered by the chemist of the Mint.

The important question of the amount of gold actually in circulation has not been lost sight of, and the author sums it up by quoting the following passage:—"The amount of gold actually in circulation is estimated to be 100,000,000*l.*, but the coinage returns show that the amount of sovereigns and half-sovereigns issued since 1816, when their coinage began, is 247,521,429. What, then, has become of the one hundred and forty-seven millions not in circulation?" No doubt a considerable proportion has been exported never to return, but we do not think, with the author, that the operations of manufacturing goldsmiths and jewellers would account for a very large proportion of the deficiency.

There are some remarkable slips in the printing. For instance, the well-known historian of the coinage is called the Rev. Rogers Rudling, and Sir John Pettus appears as Petters; but viewed as a whole, the work may be commended as tending to disseminate information respecting the precious metal which it is desirable should be widely known.

Magnetism and Electricity. By W. G. Baker. (London: Blackie and Son.)

WITH the multitude of elementary text-books on magnetism and electricity already existing the production of a fresh one might well have seemed an unnecessary task. Nor is there anything in the little book now before us in the least degree new, either in matter or in arrangement. So far as it goes, however, it is quite satisfactory. It consists of 143 pages, and in this space the author has managed to give in a clear manner an account of so much of the subject as might reasonably be put before a

school class for beginners. As it appears from his preface that this was the sole object of the author in writing the little book, he is entitled, we think, to consider that his object has been attained.

Bacillary Phthisis of the Lungs. By Germain Sée, translated by William H. Weddell. (London: Kegan Paul, Trench and Co., 1885.)

THIS is in many respects an unsatisfactory book. It is divided into seven parts. Of these the preliminaries and the first four parts comprise anatomical and histological notes, the biological study of micro-organisms generally, and the study of the bacillus tuberculosis especially, and all kinds of promiscuous notes on the causes of tuberculosis; but, owing to the dogmatic way in which these subjects are treated, the omission of details and the numerous mycological inaccuracies this portion of the book is very weak. The rest, treating of clinical, hygienic, and therapeutic subjects, is more within the author's proper domain, and will be found instructive to the medical practitioner.

Mineral Resources of the United States. By A. Williams. (Published by the U.S. Geological Survey, 1883.)

THIS book consists of a series of essays, of various degrees of importance, on the mining and metallurgic industries of the United States. The work has been mainly carried out by entrusting each subject, or a special branch of each subject, to a gentleman intimately acquainted with that branch. The thoroughness with which the subject is treated is shown by the fact that the natural history of so rare a substance as hiddenite is very fully discussed by the original discoverer, Mr. W. E. Hidden.

Naturally the most important and the most extensive essays are those on coal, iron, copper, and zinc. Silver, the position of which is at present one of the most difficult problems connected with the metals, was excluded by Act of Congress from the present investigation, and tables of the production of gold and silver in recent years are all the information given. Former publications of the U.S. Government have already made known the enormous wealth of the silver-mines, and have given fair means by which persons interested in mining may estimate the prospect of success in such undertakings.

Under iron, an account is given of the Bower-Barff process of protecting iron from rust by means of a thin film of magnetic oxide—a process which bids fair, if it stand the trial of some years' wear, to replace the process of galvanising.

To professional people who need accurate information as to the condition of the various industries, the book possesses great value. It is also full of interest to the scientific mineralogist who has mainly to depend on the opening of new mines for fresh discoveries in the mineral kingdom. One cannot help regretting, however, the space given to a history of the divining-rod, "natural magnets," and similar absurdities. The subject is as much out of place as an account of the astrological nonsense practised in the Middle Ages would be in a modern treatise on spherical astronomy.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

Pitcher Plants

PERHAPS you will allow me to set "W. C. M." right with egard to *Sarracenia variolaris* and pitcher plants generally (p. 295). I am afraid the sources from whence he obtained his information were not very reliable, as will be seen from the following:—

There are six species of Sarracenia found in North America, all of them characterised by the same trumpet-shaped leaves growing in tufts, and in several of the species attaining a length of a yard. In addition to these there is the *Darlingtonia californica*, which has long twisted trumpet-shaped leaves, the top of which is curved over, forming a sort of hood, and having a rather small aperture on each side. These constitute the whole of the pitcher plants of North America. "W. C. M.," whilst professing to describe the "curious characteristics" of the Sarracenia, really describes the leaf and pitcher of Nepenthes, which, as almost everybody knows, are tropical plants, mostly natives of the Indian Archipelago, and well known in this country as ornamental stove plants. The pitchers vary much in size, some of the species producing them quite eighteen inches long and capable of holding a quart of water, whilst others have pitchers no larger than a thimble. "W. C. M." is quite wrong in saying that the lids of the pitchers of Nepenthes, or indeed of any pitcher-plant known, close again after they have once opened. When the pitcher is about full-grown, the lid pushes open, widely in some species, only slightly in others, and remains quite stationary till the pitcher dies. When the lid opens, the pitcher is found to be about one-quarter filled with a sweetish watery liquid. Under cultivation it is necessary to keep the pitchers filled with water, or they soon shrivel; and it is found that, however frequently the water is renewed, it soon acquires a slight sweetness; so that the secretion of "honey" going on in the pitcher must be somewhat copious. If the water which is in the pitcher when it first opens dries up, there is no further secretion of liquid—at least such is the case with cultivated plants. At Kew the oldest pitchers on the Nepenthes attract insects as long as they contain moisture. The Sarracenias have their pitchers formed by the folding and joining of the edges of the leaves, so as to make a long funnel which is wide at the mouth and narrowed to almost a point at the base. Over the mouth the flap-like lid is fixed and in some of the species stands erect so as to admit rain-water into the pitchers, whilst in others the lid curves over in such a manner as to hinder the rain from falling into them. In 1815 the then President of the Linnean Society, Dr. James McBride, read a communication on the fly-catching propensity of Sarracenias, from which the following is worth quoting, as it describes accurately what we have repeatedly observed in the collection of Sarracenias cultivated at Kew. He says, writing chiefly about *Sarracenia variolaris*: "If, in the months of May, June, or July, when the leaves of these plants perform their extraordinary functions in the greatest perfection, some of them should be removed to a house and fixed in an erect position, it will soon be perceived that flies are attracted by them. These insects immediately approach the fauces of the leaves, and, leaning over their edges, appear to sip with eagerness something from their internal surface. In this position they linger, but, at length allured, as it would seem by the pleasures of taste, they enter the tubes. The fly, which has thus changed its situation, will be seen to stand unsteadily, it totters for a few seconds, slips, and falls to the bottom of the tube, where it is either drowned or attempts in vain to ascend against the points of the hairs. The fly seldom takes wing in its fall and escapes. In a house much infested with flies this entrapment goes on so rapidly that a tube is filled within a few hours, and it becomes necessary to add water, the natural quantity being insufficient to drown the imprisoned insects. The leaves of other species might well be employed as fly-catchers; indeed I am credibly informed that they are in some neighbourhoods. The leaves of *Sarracenia flava*, although they are very capacious, and often grow to a height of three feet or more, are never found to contain so many insects as those of other species. The cause which attracts flies is evidently a sweet viscid substance resembling honey, secreted by, or exuding from, the internal surface of the tube. From the margin, where it commences, it does not extend lower than one-fourth of an inch. The falling of the insect as soon as it enters the tube is wholly attributable to the downward or inverted position of the hairs of the internal surface of the leaf. At the bottom of a tube, split open, the hairs are plainly discernible pointing downwards; as the eye ranges upwards they gradually become shorter and attenuated, till at, or just below, the surface covered by the bait, they are no longer perceptible to the naked eye nor to the most delicate touch. It is here that the fly cannot take a hold sufficiently strong to support itself,